

First, I would like to thank the EPA and the village of Hot Springs for the chance to speak to the facts as we see them. I've been traveling to the Black Hills for over 30 years, and recently purchased a house here in Hot Springs. I've been a rock hound of sorts and a minor geology buff for many years. After reading the Class 3 and Class 5 permit fact sheets provided by the EPA in regards to the proposed Azarga project, it is evident to me that this project is, at the very least, impractical, and at the very worst, extremely dangerous. Considering the complex sub-surface geology of the area and its close proximity to known fault zones, the choice to use injection well technology to both contain contaminated waste waters and mine sub-surface uranium deposits, is both irresponsible and potentially catastrophic.

I would like to comment on just a few of the potential sticking points. Page 23 of the Class 5 fact sheet states the locations and conditions of fault zones in relation to the project area. And I quote: "The Dewey structural zone consists of steeply dipping to vertical faults that are uplifted on the north side relative to the south side of the zone a total of 500 feet. The Long Mountain structural zone is located approximately 7 miles south of the project area. This fault zone consists of small NE-trending normal faults observed in outcrops of the Inyan Kara Group and Sundance Formation within a zone measuring several miles across. The displacement across the faults measures up to 40 feet, with folding of the strata adjacent to the faults adding up to 60 feet additional structural relief. The faults in the Dewey Quadrangle occur NW of the Dewey Fault in the Dewey Terrace area approx. 1.5 miles NW of the project area. A sub-surface fault was identified by seismic methods about 5.5 miles N of the project area boundary. It is about 1.5 miles long and 400 feet wide. 3 Faults are shown in the NE corner of the Burdock Geologic Quadrangle. The report states that these faults have a displacement of less than 10 feet and are located 2.5 miles or more from the eastern edge of the project boundary." So in short, there are at least a half dozen faults of differing size located within a mile and a half to 5 and a half miles from the project zone. Page 25 of the Class III Draft fact sheet draws an even better picture of the Dewey Fault in particular, and I quote, "The Dewey Fault, a NE to SW trending fault zone, lies approx. 1500 feet NW of the DeweyBurdock Area Permit Boundary."

So again, we have a steeply dipping fault line lying less than a half-mile away from the project zone. Related to those facts, page 26 of the same sheet states, and I quote, "many other faults are probably present but not discernible because of poor exposures." LET ME REPEAT THAT. In response, it is stated that "If there are any faults and fractures occurring within a well field area that cause a breach in a confining zone, they will be detected during the wellfield drill and pump testing. If found, the placement of injection and production wells can be modified from the regular pattern to control lixiviant flow around the fractures or faults to keep it flowing through the uranium ore bodies rather than along these paths of lower hydraulic resistance." So if additional fractures and faults are found in the project area, and there are already many, PowerTech will simply and safely adjust the flow around these breach zones and continue to mine uranium? To think that you can safely continue to apply injection well technologies in an area of potentially breaching fractures and faults, I find to be both ridiculous and irresponsible. If the information showing the close proximity of numerous fault zones to this injection well area is not enough to disallow this project, we must also consider the confining layers that will be used to contain the injected toxic fluid. The entire project area relies upon a lower and upper containment layer of Fuson shale that underlies the whole region. However, to quote from page 22 of the Class 3 fact sheet, "There may be points where the Fuson confining zone has been compromised by improperly plugged exploration drillholes or wells that penetrate the Fuson confining zone. Evidence that suggests at least one breach in the Fuson confining zone is included in the reports on the pump tests ... conducted in the Chilsen Aquifer in the Burdock area." It is clear from pages 15 and 17 of the Class 5 sheet that the porous nature of the Minnelusa sandstone as an upper containing layer is a concern. From page 18 of the same sheet, "Low-permeability layers in the lower part of the Minnelusa Formation generally act as an upper confining zone to the Madison Aquifer. However, karst features (limestone that has dissolved and is in some stage of collapse) in the top of the Madison Limestone may contribute to reduced competency of the overlying confining zone in some locations." I suspect we would all like to know where those locations are, and what the consequences of their "reduced competency" will be. I think it should also be mentioned that, on page 25 of the Class 5 fact sheet, PowerTech's own miscalculations on the pressure required to move fluid from containment layers to public water supplies is openly challenged by the EPA itself.

Beyond that, we must also consider the history of Power Tech drill sites from the past, and the competency of the work that was done. State regulation requires drillholes be plugged after they are logged. Newer PowerTech drillholes were plugged and abandoned according to SD regulations. However, historical drillhole records are not available to show how they were plugged. On page 37 of the same report, "It is possible that some historical drillholes may not have been plugged in a manner that would prevent communication between sub-surface aquifers." Page 45 of the same report states, "With one exception, groundwater discharging to the ground surface is limited to flowing artesian wells ... the only feature identified that was indicative of groundwater discharge from exploration drillholes at or near surface was the alkali area in the SW corner of the Burdock portion of the project area." "PowerTech has identified this area as a ISE - possible location where groundwater may be discharging to the surface from the Fall River and possibly the Chilson (aquifers) to the surface through an abandoned exploration drillhole." PowerTech will not be able to begin injection activity until this issue is resolved. Resolutions of the issue may involve locating and plugging of improperly plugged historic drillholes, locating and performing corrective action on nearby wells that create a pathway through the Fuson confining zone, or a pumping, injection and monitoring plan that demonstrates control of lixiviant in the areas where breaches in the Fuson confining zone have been identified." It is obvious that there already exist communication between aquifers because of these abandoned drillholes. And it is also clear that they are fully expecting there to be further breaches in these confining zones. To think that all of these potential breaches and leaking drillholes can be identified and resolved is wishful thinking, at best.

In its own outlines, the USGS lists specific factors necessary for injection wells to induce earthquakes. Those factors include the presence of faults that are large enough to produce earthquakes, stresses that are large enough to produce earthquakes, and the presence of pathways for the fluid pressure to travel from the injection point to faults. It is obvious that those same factors are in severe question in relation to this injection project.

Finally, I think what I would like to say is that geology is an imperfect science. I'm sure the PowerTech geologists would agree. What cannot be seen below ground, cannot be anticipated or contained. In my opinion, considering the toxic nature of these injection fluids and the obvious dangers of both questionable confining layers -and their close proximity to known -and unknown fault and fracture lines, the idea that this project can be done safely and with no ill effects to our water supply or to local geologic integrity, is foolhardy and defenseless. The massive public and environmental loss that could very well occur far outweighs the private gain that is being sought. thank you.